PROJECT NUMBER: 1804

PROJECT TITLE : Thermal Treatment Processes

PERIOD COVERED: February 1-28, 1983

PROJECT LEADER: R. G. Uhl

OBJECTIVE

Develop thermal treatment technology to improve the filling power, piece size and modify the subjective response of tobacco.

STATUS

1. Trials were continued to characterize and determine the limitations of the 4" horizontal tower. Five quench nozzles were evaluated, with nozzle size and process gas temperature being varied. Wet spots in the product were only encountered with a spray nozzle installed at the separator transition piece. Results confirmed preliminary indications. High water spray rates stop thermal treatment in the reordering zone and limit product CV, indicating the need for more tower length. Product CV's of 50-55 are obtained with in-situ reordering to 10-11% OV, while normal CV (75) is achieved with product reordered to only 5-6% OV.

2. Overall sieve results show an advantage with the horizontal tower. Average tower exit values using the "new" %L/%L+M (>6 mesh/total >12 mesh) are 21/60 for the horizontal tower versus 17/55 for the pilot 8" tower and 12/52 for MC/DET this quarter.

3. Four spray nozzles were installed on the 8" tower (one at each elbow; two in the riser) to evaluate in-situ reordering on a conventional expansion system. CV results approximated horizontal tower results, showing the same dependence on spray rate (49 CV at 11% tower exit OV; 76 CV at 5% tower exit OV). Tower exit longs (12-14%) were lower than conventional product. Nozzle size at the first (lower) elbow had to be limited to prevent passage of ice balls and wet clumps through the tower and drastic loss of product CV, indicating that little expansion had taken place up to this point in the system.

4. Small (25 lb) batches impregnated in Phase III were soft enough to be processed without the clumpbreaker. However, this material showed little improvement in longs fraction at the 8" tower inlet valve, and yielded only a small improvement in the tower exit piece size (%L/%L+M = 18/59).

5. CAR unit treatment of 20% OV uncased bright strip showed several disadvantages versus the treatment of cut tobacco at the same conditions. The strip product had gross non-uniformities in reducing sugar and alkaloid content. This is attributed to reduced internal air circulation with strip. Also, CV gain was only half the cut tobacco value, indicating that strip would require significantly longer treatment times to effect a given subjective change.

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6. Overall average sieve results for CAR treated cut bright show that longs fraction loss during CAR treatment is comparable to the loss encountered in tower expansion systems.

7. CAR treated bright tobaccos taken to the same CV endpoint by different time/temperature profiles are currently being subjectively screened in 100% and blended cigarette models.

8. Marlboro cut filler (12% OV) was CAR treated at the maximum heating rate (5 F°/min). CV increased 12 units in 15 minutes of heat treatment, with no additional increase at longer times. Shorter treatment times will be investigated prior to subjective testing.

9. The initial microwave oven simulation of the roaster drying process was completed. Marlboro cut rag showed a small advantage (up to 1 CV unit) attributable to superwetting to 30 and 40% OV. Maximum CV results were obtained with constant moisture bulking at 200°F. Longer bulking times will be examined to determine if the maximum effect has been attained.

PLANS

1. Prepare design proposal and initiate installation of a longer horizontal expansion tower.

2. Evaluate the effect of cut width on expanded product piece size for conventional and horizontal towers.

3. Evaluate gaseous impregnation to determine the effect on the piece size of impregnated feedstock and expanded product.

4. Replace the center mounted spray nozzles on the horizontal tower with nozzles mounted flush with the pipe wall and evaluate the effect on product breakage.

5. Evaluate the effect of casings on CAR product CV's and have cigarettes made for subjective comparison.

6. Determine the feasibility of blending CAR treated cut bright into the final cut blend.

7. Evaluate short CAR treatment times for MF cut filler.

8. Microwave roaster simulation:

   a. Evaluate longer superwet bulking times.
   b. Define maximum CV procedure.
   c. Initiate testing of factory MF cut rag.
   d. Initiate testing of individual blend components.

/dbb

R. F. Tilt

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